

WHAT IS CLAIMED IS:

1. A friction stir welding method for friction stir welding a first member and a second member, said first member having a first plate, a second plate disposed substantially parallel to said first plate, and a third plate connecting an end portion of said first plate and said second plate, said third plate being disposed substantially orthogonal to said first plate, comprising the steps of:

arranging a recessed portion in connection portion between said third plate and said first plate;

opening said recessed portion directed toward an outer side of a thickness direction of said first member and toward said end portion of said first member;

overlapping an end portion of said second member to said recessed portion, to provide an overlapped portion; and

in a condition where said first member and said second member in said overlapped portion are supported, and in a condition where a rotary tool is inserted into said overlapped portion from said outer side, carrying out friction stir welding of said overlapped portion.

2. A friction stir welding method according to claim 1, wherein the friction stir welding is carried out by positioning a rotation center of said rotary tool within a range of an extension line of a thickness of said third plate.

3. A friction stir welding method for friction stir welding a first member and a second member, said first member having a first plate, a second plate disposed substantially parallel to said first plate, and a third plate connecting an end portion of said first plate and said second plate and disposed substantially orthogonal to said first plate, comprising the steps of:

arranging one recessed portion in a connection portion between said third plate and said first plate;

arranging another recessed portion in a connection portion between said third plate and said second plate;

opening said one recessed portion and said another recessed portion directed toward an outer side of a thickness direction of said first member and toward said end portion of said first member;

overlapping an end portion of said second member to said one recessed portion and said another recessed portion, respectively providing one overlapped portion and another overlapped portion; and

in a condition where said first member and said second member in said one overlapped portion are supported, and in a condition where a rotary tool is inserted into said another overlapped portion from said outer side, carrying out a friction stir welding to said another overlapped portion.

4. A friction stir welding method according to claim 3, wherein the friction stir welding is carried out by positioning a rotation center of said rotary tool within a range of an extension line of a thickness of said third plate.

5. A friction stir welding method according to claim 3, wherein:

after carrying out the friction stir welding to said another overlapped portion, reversing said first member and said second member; and in a condition where said first member and said second member in said another overlapped portion are supported, and in a condition where a rotary tool is inserted into said one overlapped portion from said outer side, carrying out the friction stir welding to said one overlapped portion.

6. A friction stir welding method according to claim 3, wherein: one rotary tool is arranged from said outer side of said one overlapped portion and another rotary tool is arranged from said outer side of said another overlapped portion;

said another rotary tool is arranged substantially at a rotation center of an extension direction of said one rotary tool; and

carrying out simultaneously the friction stir welding with said one rotary tool and said another rotary tool.

7. A friction stir welding method according to claim 3, wherein in a condition where said first member and said second member of said one overlapped portion are mounted on a bed, carrying out the friction stir welding to said another overlapped portion from an upper portion.

8. A friction stir welding method for friction stir welding a first member and a second member,

said first member having a first plate, a second plate disposed substantially parallel to said first plate, and a third plate disposed substantially

orthogonal to said second plate in an end portion of said second plate and connecting a midway of said first plate,

said second member having a first plate, a second plate disposed substantially parallel to said first plate, and a third plate disposed substantially orthogonal to said second plate in an end portion of said second plate and connecting a midway of said first plate, comprising the steps of:

arranging one recessed portion in a connection portion between said third plate of said first member and said second plate of said first member;

arranging another recessed portion in a connection portion between said third plate of said second member and said second plate of said second member;

opening said one recessed portion directed toward an outer side of a thickness direction of said first member and toward said end portion of said second plate of said first member;

opening said another recessed portion directed toward an outer side of a thickness direction of said second member and said end portion of said second plate of said second member;

overlapping an end portion of said first plate of said second member to said one recessed portion of said first member, to provide one overlapped portion;

overlapping an end portion of said first plate of said first member to said another recessed portion of said second member, to provide another overlapped portion; and

in a condition where said first member and said second member in said one overlapped portion are supported, and at a condition where a rotary tool

is inserted into said another overlapped portion from said outer side, carrying out a friction stir welding of said another overlapped portion.

9. A friction stir welding method according to claim 8, wherein the friction stir welding is carried out by positioning a rotation center of said rotary tool within a range of an extension line of a thickness of said third plate.

10. A friction stir welding method according to claim 8, wherein:  
after carrying out the friction stir welding of said another overlapped portion, reversing said first member and said second member; and  
in a condition where said first member and said second member in said another overlapped portion are supported, and in a condition where a rotary tool is inserted into said one overlapped portion from said outer side, carrying out the friction stir welding of said one overlapped portion.

11. A friction stir welding method according to claim 8, wherein:  
one rotary tool is arranged at said outer side of said one overlapped portion;  
another rotary tool is arranged at said outer side of said another overlapped portion;  
said another rotary is arranged substantially at a rotation center of an extension line of said one rotary tool; and  
the friction stir welding is carried out simultaneously from an outer side of said one overlapped portion and said another overlapped portion.

12. A structural body comprising:

a first member and a second member, wherein said first member has a first plate, a second plate disposed substantially parallel to said first plate, and a third plate connecting an end portion of said first plate and an end portion of said second plate and disposed substantially orthogonal to said first plate and said second plate;

one recessed portion is arranged in a connection portion between said third plate of said first member and said first plate of said first member;

another recessed portion is arranged in a connection portion between said third plate of said first member and said second plate of said first member;

said second member is overlapped to said one recessed portion from an outer side of a thickness direction of said first member, to provide one overlapped portion;

said second member is overlapped to said another recessed portion from said outer side of said thickness direction of said first member, to provide another overlapped portion;

a friction stir welding is located at said one overlapped portion and said another overlapped portion; and

a center of a joining bead of the friction stir welding is arranged within an extension line of a thickness of said third plate.

13. A structural body comprising:

a first member and a second member, wherein said first member has a first plate, a second plate disposed substantially parallel to said first plate, and a

third plate connecting an end portion of said first plate and an end portion of said second plate and disposed substantially orthogonal to said first plate;

a recessed portion is arranged in a connection portion of said third plate and said first plate;

said second member is overlapped to said recessed portion from an outer side of a thickness direction of said first member, to provide an overlapped portion;

a friction stir welding is located at said overlapped portion; and  
a center of a joining bead of the friction stir welding is arranged within an extension line of a thickness of said third plate.